

RECORDS AND DESCRIPTIONS OF SIPHONAPTERA.

By DR. KARL JORDAN, F.R.S.

(With 10 text-figures.)

A COLLECTION of fleas sent to me for identification by Dr. J. Bequaert, Harvard Medical School, Boston, Mass., contains several new species from Africa and Asia, which are here described. Many of the other species are from places whence we have no record of fleas, or were obtained on hosts new for the species. A list of the collection, therefore, is of some value. The new bat-flea is a most interesting insect, upsetting our concept of a bat-flea by possessing three instead of two fully developed preoral spines, suggesting that the bat-fleas have originated from an ancestral form which had a row of spines along the ventral margin of the head. The vestigial third spine of *Chiropteropsylla brockmanni* Roths. 1915 points in the same direction. I am much indebted to Dr. J. Bequaert for allowing me to keep the types and other specimens for the N. C. Rothschild (British Museum) collection.

In order to facilitate the use of this article, I divide the list into two sections, the first dealing with American species only, and the second with the species from the Eastern Hemisphere.

I. AMERICAN SPECIES.

1. *Echidnophaga gallinaceus* Westw. 1875.

Florida : Sebastian, on *Spilogale ambarvalis*, 3 ♀♀.

2. *Pulex irritans* L. 1758.

Mexico : Monclova, on Indians, 2 ♀♀.—Proboscis short.

3. *Ctenocephalides felis felis* Bouché 1835.

Florida : Sebastian, on *Spilogale ambarvalis*, 1 ♀.

4. *Ctenocephalides canis* Curtis 1826.

Mexico : Monclova, on Indians, 2 ♀♀.

5. *Hoplopsyllus glacialis glacialis* Tasehenb. 1880.

East Greenland : Franz Josef Fjord, on Polar Hare, 2 ♂♂, 3 ♀♀.

6. *Hoplopsyllus glacialis lynx* Baker 1904.

New Hampshire : on *Lynx canadensis*, 3 ♂♂, 7 ♀♀.

7. *Cediopsylla simplex* Baker 1895.

Massachusetts : on *Sylvilagus floridanus transitionalis*, 2 ♂♂, 4 ♀♀.

8. *Rhopalopsyllus cacticus saevus* J. & R. 1923.

Guatemala : Pulgera, North of El Paso, Peten, on *Dasypus novemcinctus mexicanus*, 1 ♀.

9. *Orchopeas nepos* Roths. 1905.

Oregon : Fort Klamath, on *Sciurus douglasi*, 1 ♀.

10. *Orchopeas caedens durus* Jord. 1929.

Massachusetts : Cambridge, on *Sciurus carolinensis leucotis*, 1 ♀.

11. *Orchopeas wickhami* Baker 1895.

Massachusetts : Harvard, on *Sciurus hudsonius loquax*, 1 ♂, 5 ♀♀; Boxboro, on *Sciurus carolinensis leucotis*, 1 ♂, 1 ♀.

12. *Orchopeas leucopus* Baker 1904.

Massachusetts : Barnstable, on *Mus musculus*, 1 ♀.—Rhode Island : Kingston, on *Peromyscus leucopus noveboracensis*, 2 ♂♂.

13. *Diamunus montanus* Baker 1895.

California : San José, on *Otospermophilus beecheyi*, 1 ♀.

14. *Opisocrostis tuberculatus* Baker 1904.

North Dakota : Towner, on *Spermophilus franklini*, 5 ♂♂.

15. *Opisocrostis labis* J. & R. 1915.

Colorado : on *Marmota flaviventris*, 1 ♀.

16. *Oropsylla arctomys* Baker 1904.

Massachusetts : Wellesley, on *Marmota monax preblorum*, 1 ♂; Barnstable, same host, 1 ♂, 1 ♀; Essex, same host, 1 ♂, 1 ♀.—Connecticut : Liberty Hill, on *Syrnium nebulosum*, 1 ♂, 1 ♀ (the owl had probably eaten a *Marmota*). —New York : West Point, on *Urocyon cinerco-argenteus*, 1 ♀ (as before); Tupper Lake, on *Marmota monax rufescens*, 5 ♂♂, 3 ♀♀.

17. *Oropsylla rupestris* Jord. 1929.

Colorado : on *Marmota flaviventris*, 2 ♀♀.

18. *Foxella ignotus albertensis* J. & R. 1915.

North Dakota : Round Lake, McHeary Co., on *Mustela longicauda longicauda*, 1 ♂, 3 ♀♀.

19. *Megabothris acerbus* Jord. 1925.

Michigan : Douglas Lake, on *Tamias striatus listeri*, 1 ♀.—Massachusetts : Harvard, same host, 1 ♂.

20. *Megabothris quirini* Roths. 1905.

Minnesota : East Grand Forks, on *Zapus hudsonius campestris*, 1 ♂.

21. *Ceratophyllus idius* J. & R. 1920.

Massachusetts : Rock, from nest of *Sialis sialis*, 14 ♂♂, 10 ♀♀, and from nest of *Tachycineta bicolor*, 4 ♂♂, 5 ♀♀.

22. *Ceratophyllus gallinae* Sehrank 1803.

Massachusetts : Robson Park, from nest of *Sialis sialis*, 3 ♂♂, 8 ♀♀.

23. *Nosopsyllus fasciatus* Bosc 1801.

Massachusetts : Barnstable, on *Rattus rattus norvegicus*, 1 ♀.

24. *Leptopsylla segnis* Schönh. 1816.

Massachusetts : Cambridge, on mouse in laboratory, 1 ♂.

25. *Leptopsylla catatina* Jord. 1928.

Massachusetts : Ashburnham, Mt. Watatic, on ear of *Eutamias gapperi*, 1 ♂ (Francis Harper).

26. *Ctenophthalmus pseudagyrtus* Baker 1904.

Massachusetts : Natick, from mouse nest, 3 ♂♂, 2 ♀♀; Barnstable, on *Microtus p. pensylvanicus*, 1 ♂.—New Hampshire : Hancock, on *Parascalops breweri*, 1 ♂, 2 ♀♀.

27. *Neopsylla wenmanni* Roths. 1904.

North Dakota : Round Lake, McHeary Co., on *Mustela longicauda longicauda*, 1 ♀.—Massachusetts : Barnstable, on *Rattus rattus norvegicus*, 1 ♀, and on *Peromyscus leucopus noveboracensis*, 1 ♀.

28. *Neopsylla inopina* Roths. 1915.

North Dakota : Tower, on *Spermophilus franklini*, 1 ♀.—The head of the spermatheca is somewhat shorter than in our examples from Alberta and Washington.

29. *Neopsylla grandis* Roths. 1900.

Massachusetts : Petersham, on *Mustela n. noveboracensis*, 1 ♀.

30. *Stenoponia americana* Baker 1899.

Massachusetts : Wellfleet, on *Scalops aquaticus*, 1 ♂.—Rhode Island : Kingston, on *Peromyscus leucopus noveboracensis*, 1 ♀.

31. *Myodopsylla insignis* Roths. 1903.

Vermont : Mt. Aeolus, on *Myotis l. lucifugus*, 1 ♀; Chittenden near Rutland, same host, 1 ♂, 1 ♀.—Massachusetts : Hatchville, same host, 5 ♀♀; Mashpee, same host, 2 ♂♂; Centerville, same host, 1 ♂.—Indiana : Wyandotte Cave, same host, 1 ♀.

II. EASTERN HEMISPHERE.

Palearctic : nos. 32, 39, 42, 43, 48. Oriental : nos. 41, 45, 46, 47, 49, 50, 51, 52. Aethiopian : nos. 33-38, 40, 44, 53.

32. *Pulex irritans* L. 1758.

Transjordanian : Petra, on *Canis aureus*, 1 ♀.

33. *Synosternus somalicus* Roths. 1903.

Kenya : Neumann's Boma on the Guasa Nyiro, on *Xerus rutilus rufifrons*, 3 ♀♀.

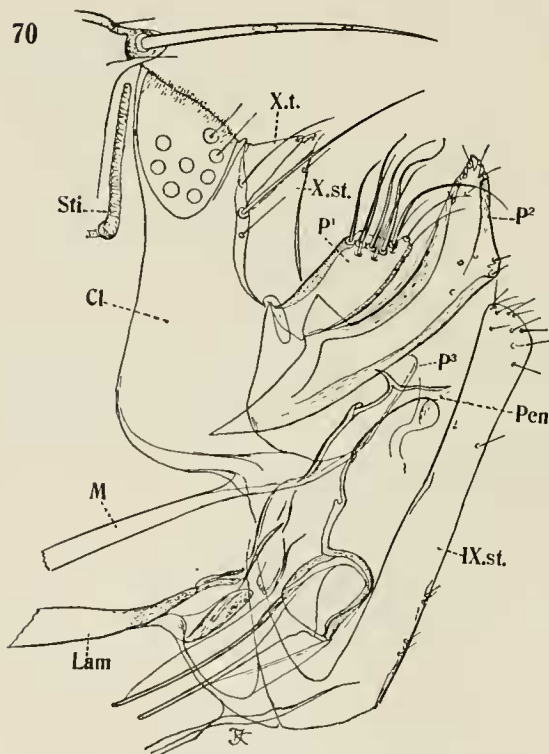
34. *Procaviopsylla isidis* Roths. 1903.

Kenya : Elgonyi, Mt. Elgon, on *Procavia habessinica daemon*, 1 ♂, 1 ♀ (A. Loveridge) ; Guasa Nyiro, on *Heterohyrax syriacus hindei*, 1 ♀.

35. *Xenopsylla brasiliensis* Baker 1904.

Belgian Congo : Mulubula, Sankuru, on "domestic rat," 5 ♀♀.

70



36. *Xenopsylla sarodes* sp. nov. (text-fig. 70).

Kenya : Guasa Nyiro, on *Saccostomus isiolae*, 1 ♂.

Near *X. tortus* J. & R. 1908 and *X. scopulifer* Roths. 1905 ; genitalia very distinctive.

Eye smaller than even in *X. tortus*. Dorsal groove of occiput much less deep than in both allied species. On mesopleura 5 bristles ; on metepimerum 5, 7 and 6, 7. Apical cone of tergum VII nearly as prominent as in *X. scopulifer*. Hindcoxa with a row of 4 or 5 short spiniforms on inner side.

Modified Segments.—Posterior margin of tergite IX with one long and two short bristles (text-fig. 70). Process P¹ of clasper as broad as in *X. scopulifer*, but longer, bearing 7 rather

strong and several thin bristles ; process P² much broader than in the allied species, elbowed at three-fourths of ventral margin, broader at the elbow than proximally of it, the apical portion almost gradually narrowing to a point.

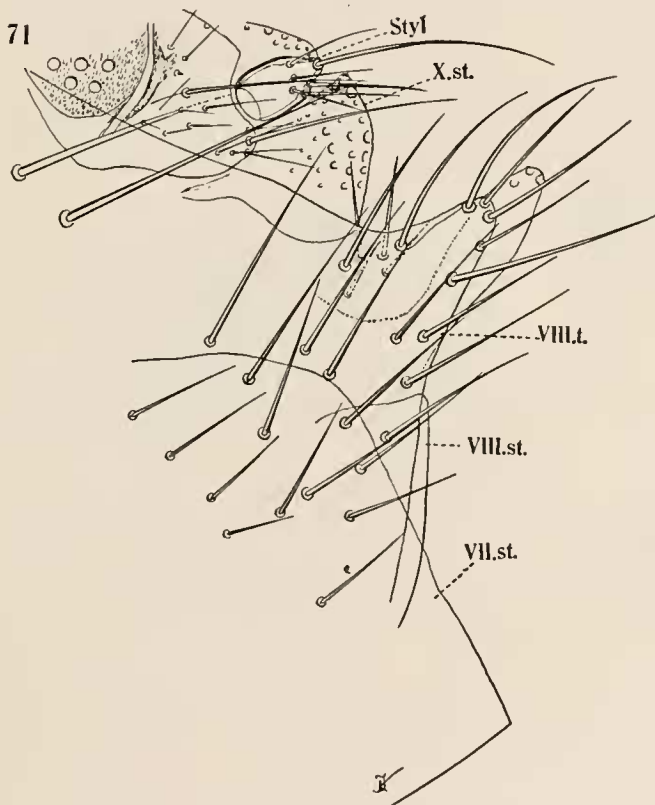
Ventral arm of IX. st. straight, its apex ventrally rounded, dorsally sub-acuminate. Apical tube of ejaculatory duct (Pen) with a dorsal hook which is longer than in *X. scopulifer* and much longer than in *X. tortus*.

37. *Parapulex chephrenis* Roths. 1903.

Egypt : Wady Ferran, on *Acomys dimidiatus*, 1 ♂, 2 ♀♀.

38. *Ctenocephalides felis strongylus* Jord. 1925.

Uganda : Butandiga, Mt. Elgon, on *Genetta servalina beltoni*, 1 ♀ (A. Loveridge).—Kenya : Elgonyi, Mt. Elgon, on *Lepus capensis kukumegae*, 1 ♂, 2 ♀♀ (A. Loveridge).—Sudan : Mahangani, Blue Nile, on *Caracal caracal nubica*, 1 ♂, 2 ♀♀.



39. *Oropsylla stejnegeri* sp. nov. (text-fig. 71).

East Siberia : East Cape, on *Citellus stejnegeri*, 1 ♀.

Nearest to *O. alaskensis* Baker 1904, but differs much in the peculiar shape of the ventral portion of tergum VIII. Chaetotaxy nearly the same in the two species.

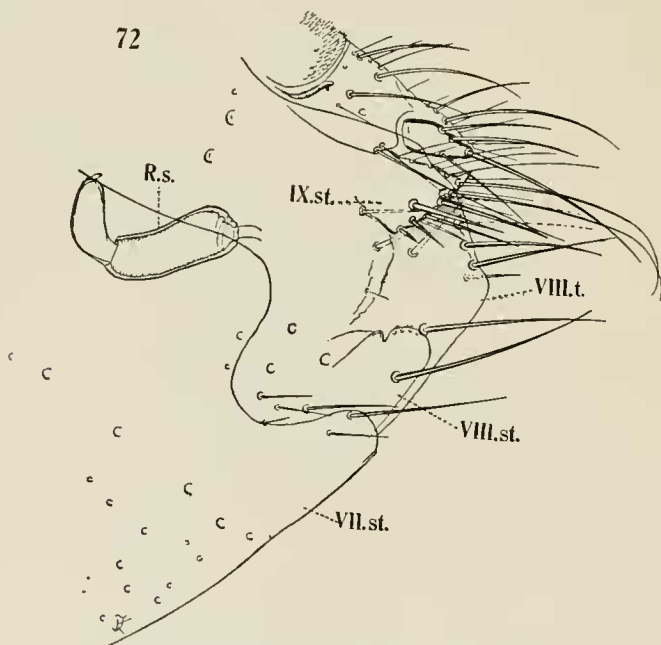
Proboscis reaching to underside of femur, apex of segment IV being on a level with apex of coxa. Pronotal comb with 24 spines. On metepimerum 14 bristles on one side and 17 on the other. Apical spines on abdominal terga (the two sides together), I 1, II 4, III 2. Bristles on abdominal segments as in

O. alaskensis; three antepygidial bristles, upper and lower about one-fourth shorter than middle one, upper slightly shorter than lower. Stigma of segment VIII as in *O. alaskensis*, larger than in *O. silantiewi* Wagn. 1898 and others; below this stigma two or three bristles. Sternum VII truncate, the upper angle rounded off. Lower portion of tergum VIII produced backwards into a prominent lobe, as shown in text-fig. 71, the lobe of the right side being much longer and narrower than that of the left side and having the shape of a long and narrow shoe-sole; this asymmetry suggests pathological development in the only specimen the collection contains. Distance of stylet from sensory plate (sensillum) less than half the length of the sensillum. Stylet short, not being quite twice as long as broad. Bristles of X. st. more numerous than in *O. alaskensis*. Spermatheca as large as in that species and of the same shape. Bristle of legs essentially as in *O. alaskensis*.

Length (somewhat distended): 4 mm.; hindfemur: 0.67 mm.

40. *Libyastus infestus duratus* Jord. 1931.

Tanganyika Territory: Mt. Meru, on "a squirrel or mouse," 1 ♀.—A squirrel-flea.



41. *Paraceras javanicus* Ewing 1924.

Java: Tjibodas, Mt. Gedeh, on *Halictis orientalis*, 1 ♂, 4 ♀♀.—Process P of the clasper is somewhat narrower than in our fig. 75 on p. 355 of Nov Zool., xxxviii (1933).

42. *Monopsyllus anadyrus* sp. nov. (text-figs. 72, 73).

East Siberia: Emma Harbour, on *Ochotona hyperborea*, 2 ♀♀.

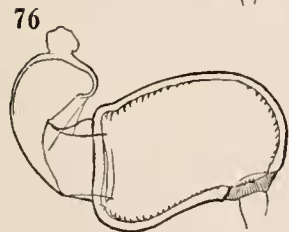
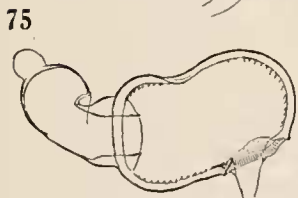
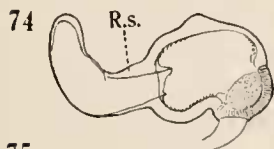
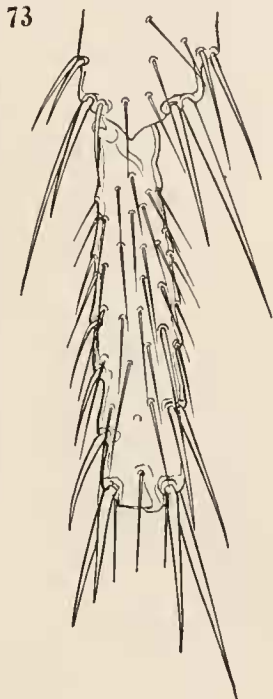
Distinguished from the other species of the genus especially by sternum VII, the numerous bristles of the tibiae and tarsi and the long spermatheca.

Pronotal comb with 22 spines and in addition each side a very small one. On metepimerum 7 to 9 bristles. Apical spines on abdominal terga (the two sides together): I 2, II 4, III 2 in type, and I 2, II 2, III 2 in paratype. On mid- and hindtibiae 7 dorsal pairs of bristles in notches and a single dorsal bristle between sixth and seventh pairs; on outer surface of hindtibia 18 or 19 dorso-lateral bristles, not including the apical bristles; midtarsal segment I with many bristles at posterior margin in basal half; on I of hindtarsus (text-fig. 73) over 20 bristles in type, not quite so many in paratype. Stigma of segment VIII rather larger than usual in this genus. Sternum VII with rounded sinus, the lobes above and below the sinus likewise rounded, the upper one much broader than the lower, about the same size as the sinus. Stylet twice as long as broad, with three lateral bristles in type and two in paratype. Spermatheca (R.s.) nearly three times as long as broad, dorsally convex at posterior end, then slightly concave, ventrally convex anteriorly and posteriorly and slightly incurved in between; orifice terminal, as in the allied species; tail shorter than body.

Length: 2.8 mm.; hindfemur: 0.48 mm.

43. *Ceratophyllus hirundinis* Curtis 1826.

Belgium: Moortsel, from nest of *Chelidonaria urbica*, 1 ♀.



44. *Dinopsyllus lypus* J. & R. 1913.

Kenya: Kaimosi, Nyanza Province, on *Dasyms helutus helutus*, 1 ♀, and on *Crocidura nyanzae nyanzae*, 1 ♀ (A. Loveridge).—Tanganyika Territory: Mt. Meru, on a squirrel or mouse, 2 ♀♀ (A. Loveridge).—Occurs on various mice and rats.

45. *Choristopsylla ochi* Roths. 1904 (text-fig. 74).

West Australia: Margaret River, on *Trichosurus vulpecula*, 1 ♀.

The spermatheca of the species not having been figured, I supply the want from the present specimen; the bursa copulatrix has unfortunately been destroyed in the process of clearing.

46. *Pygiopsylla hilli* Roths. 1904 (text-figs. 75, 76).

West Australia: Pemberton, on *Bettongia penicillata*, 1 ♂, 3 ♀♀, and on *Pseudochirus occidentalis*, 1 ♀.

The ♂ agrees nearly in all detail with the type specimen. In both sexes the spines of the pronotal comb are shorter than the pronotum, a character more

pronounced in these five specimens than in the unique type. Sternum VII of ♀ almost the same as in our text-fig. 229 in *Ectoparasites*, i, p. 237 (1922), the sinus being narrow and deep, and the incassation placed for the greater part below it. Sternum X resembles that of *P. zethi* Roths. 1904, its underside not bearing a tubercle in middle, as it does in *P. hoplia* J. & R. 1922 and *P. congrua* J. & R. 1922. Head of spermatheca (text-figs. 75, 76) broader than in those two species and somewhat variable.

We shall refer in another article of the present issue to the question of which are the true females of *P. congrua* and *P. hoplia*.

47. **Pygiopsylla hoplia** J. & R. 1922.

Queensland : Lake Barrine, on *Parames nasuta*, 1 ♂, 1 ♀.

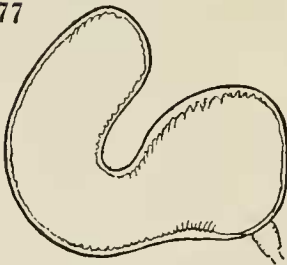
48. **Stivalius torvus** Roths. 1908.

Belgian Congo : Lukulela, on *Crocidura occidentalis*, 1 ♂ (J. P. Chapin).

49. **Stivalius corrugis** Jord. 1933.

East New Guinea : Mt. Misim, on *Peroryctes ornatus*, 1 ♂ (H. Stevens).

77



50. **Stivalius novaeguineae** Roths. 1904.

Same place and host as *St. corrugis*, 1 ♀ (H. Stevens).

51. **Stephanocircus dasyuri** Skuse 1893.

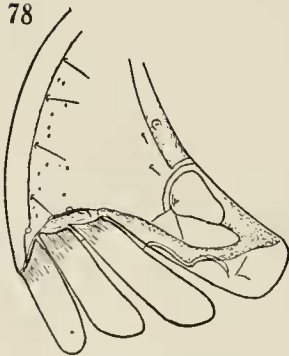
Queensland : Lake Barrine, on *Parames nasuta*, 1 ♂, 2 ♀♀.

52. **Chiropteropsylla aegyptius** Roths. 1903
(text-fig. 77).

Egypt : Gizeh, on *Rhinopoma microphyllum*, 1 ♀.

We give a figure of the spermatheca of the present specimen, the organ not having been figured before.

78



53. **Thaumapsylla breviceps** Roths. 1907.

Philippines : Nazareto Cave near Calapan, Mindoro, 1 ♂ ; Kilib Cave, Lubang Island, 1 ♂, 2 ♀♀ ; Dilirig, Province Bukidnar, Mindanao, 1 ♀ ; all on "bat."

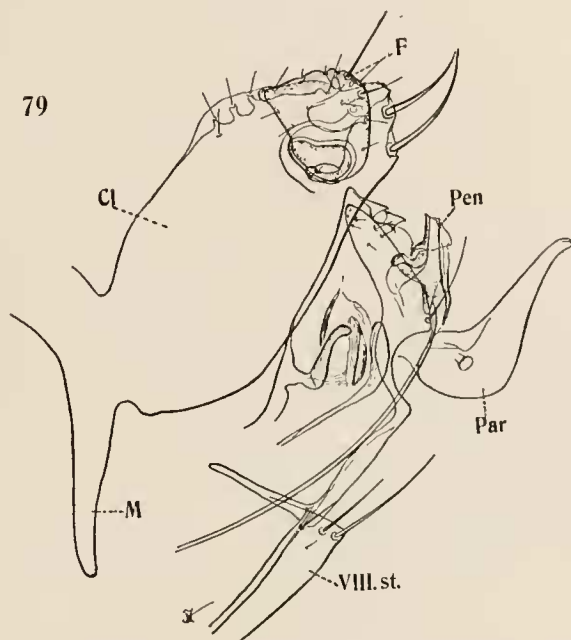
Originally described from South Africa ; according to the specimens in the N. C. Rothschild collection occurs probably throughout the Oriental Region.

54. **Thaumapsylla dina** sp. nov. (text-figs. 78, 79).

Belgian Congo : Kalongi, west slope of Mt. Ruwenzori, 6,500 ft., on *Roussettus lanosus*, 1 ♂ (J. P. Chapin).

Differs from all other bat-fleas known in bearing on each side of the head three preoral spines instead of two. Agrees otherwise rather closely with *Th.*

breviceps. Frontal portion of head ventrally broader and genal lobe longer. Proboscis a little longer. Pronotal comb with fewer and broader spines, 24 instead of 30. On each side of mesonotum the two subapical spines of underside (in *Th. breviceps* sometimes three) farther apart. On metepimerum 12 bristles. Three short apical spines on metanotum each side, on abdominal tergum I also



three, on II and III a single one each side, these single spines not present in *Th. breviceps*. Genitalia of the same type as in *Th. breviceps*, but the body of elasper (Cl, text-fig. 79) much longer, apically narrower, and the two long bristles therefore nearer the upper apical angle; finger F much broader, about as broad as long, its frontal side straight, not incurved, posterior side nearly straight in middle, dorsally and ventrally rounded. Apical lobe of IX. st. narrower than in *Th. breviceps*.